

SFP-1/10GB-LR-I-AO

MSA and TAA 1/10GBase-LR SFP+ Dual-Rate Transceiver (SMF, 1310nm, 10km, LC, DOM, -40 to 85C)

Features

- Supports rate selectable 1.25Gbps or 9.83Gbps to 11.3Gbps bit rates
- Compliant with SFF-8431
- Complaint with IEEE 802.3.2-2012 10GBASE-LR/LW and 1000BASE-LX
- 1310 DFB Laser Transmitter
- Built in Digital Diagnostic Functions
- Hot-Pluggable SFP+ Footprint
- Up to 10km on SMF
- Duplex LC Connector
- Operating Temperature: -40 to 85 Celsius
- Power Supply: 3.3V
- RoHS Compliant and Lead-Free



Applications

- 10GBase-LR Ethernet

Product Description

This MSA Compliant SFP+ transceiver provides 10GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	V _{CC}	-0.5		4	V	1
Storage Temperature	T _{stg}	-40		85	°C	
Operating Case Temperature	T _c	-40		85	°C	
Data Rate (RS0 = Low)	DR		1.25		Gbps	2
Data Rate (RS0 = High)	DR	9.83	10.3125	11.3	Gbps	2
Bit Error Rate	BER			10 ⁻¹²		

Notes:

1. For the electrical power interface.
2. IEEE 802.3-2012.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	V _{CC}	3.14	3.3	3.46	V	
Module Supply Current	I _{CC}		290	380	mA	1
Power Dissipation	P _{DISS}		1.0	1.3	W	
Transmitter						
Input Differential Impedance	R _{IN}		100		Ω	
Differential Data Input Swing	V _{IN,pp}	180		700	mVp-p	
Transmit Disable Voltage	V _D	2		Host_V _{CC}	V	
Transmit Enable Voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V	
Receiver						
Differential Data Output Swing	V _{OUT,pp}	300		850	mVp-p	
Data Output Rise/Fall Time (20-80%)	T _r /T _f	28			ps	
LOS Assert	V _{LOSA}	2		Host_V _{CC}	V	
LOS De-Assert	V _{LOSD}	V _{EE}		V _{EE} +0.5	V	

Notes:

1. For the electrical power interface.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Optical Power @1.25Gbps	PTX1	-9.5		-3	dBm	1
Output Optical Power @10.3Gbps	PTX2	-8.2		0.5	dBm	1
Optical Center Wavelength	λ_C	1260		1355	nm	
Optical Modulation Amplitude	OMA	-5.2			dBm	2
Extinction Ratio @1.25Gbps	ER1	9			dB	
Extinction Ratio @10.3Gbps	ER2	3.5			dB	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			3.2	dB	
Launch Power of Off Transmitter	P _{off}			-30	dBm	1
Transmitter Jitter						2
Receiver						
Optical Center Wavelength	λ_C	1260		1600	nm	
Receive Overload	P _{OL}	0.5			dBm	
Receiver Sensitivity @1.25Gbps	R _{X_SEN1}			-19	dBm	3
Receiver Sensitivity @10.3Gbps	R _{X_SEN2}			-14.4	dBm	4
Receiver Reflectance	TR _{RX}			-12	dB	
LOS Assert @1.25Gbps	LOSA	-30			dBm	
LOS Assert @10.3Gbps	LOSA	-30			dBm	
LOS De-Assert @1.25Gbps	LOSD			-17	dBm	
LOS De-Assert @10.3Gbps	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Average.
2. According to IEEE 802.3ae requirements.
3. Average. Test the resulting value using the minimum ER value within the defined range: $BER < 10^{-12}$ and 2^7-1 PRBS.
4. Average. Test the resulting value using the minimum ER value within the defined range: $BER < 10^{-12}$ and $2^{31}-1$ PRBS.

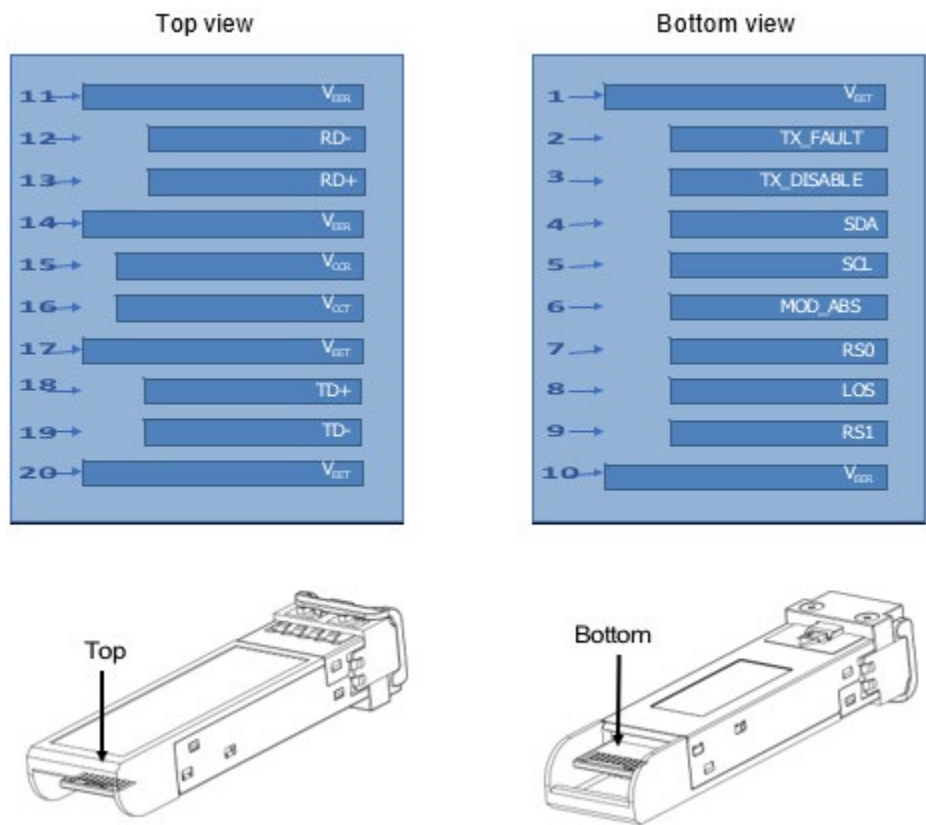
Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	Tx_Fault	Transmitter Fault.	2
3	Tx_Disable	Transmitter Disable. Laser output disables on “high” or “open.”	3
4	SDA	2-Wire Serial Interface Data.	4
5	SCL	2-Wire Serial Interface Clock.	4
6	MOD_ABS	Module Absent. Grounded within the module.	4
7	RS0	Module Rate Selection: “Open” or “Low” Level = 1.25Gbps rate (low bandwidth). “High” Level = 9.95-10.31Gbps rate (high bandwidth).	
8	LOS	Loss of Signal Indication. “Logic 0” indicates normal operation.	5
9	RS1	No Connection Required.	1
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Inverse Receiver Data Out. AC Coupled.	
13	RD+	Received Data Out. AC Coupled.	
14	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground).	1
18	TD+	Transmitter Data In. AC Coupled.	
19	TD-	Inverse Transmitter Data In. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

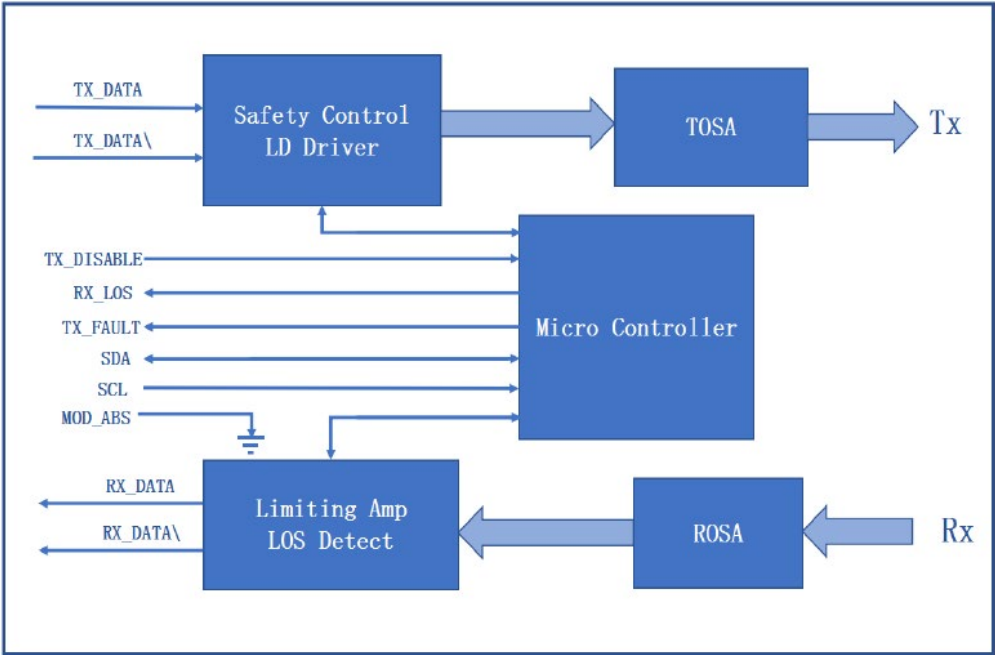
Notes:

1. The circuit ground is isolated from the chassis ground.
2. Tx_Fault is the open collector output and should be pulled up with 4.7k Ω to 10k Ω on the host board to a voltage between 2V and Vcc+0.3V.
3. Disabled: T_{DIS}>2V or open. Enabled: T_{DIS}<0.8V.
4. Should be pulled up with 4.7k Ω to 10k Ω on the host board to a voltage between 2V and Vcc+0.3V.
5. LOS is an open collector output and should be pulled up with 4.7k Ω to 10k Ω on the host board to a voltage between 2V and Vcc+0.3V. “Logic 0” indicates normal operation. “Logic 1” indicates that the receiver signal is lost.

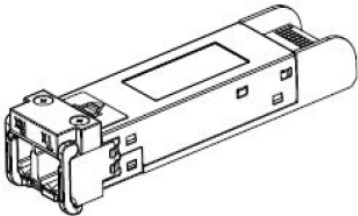
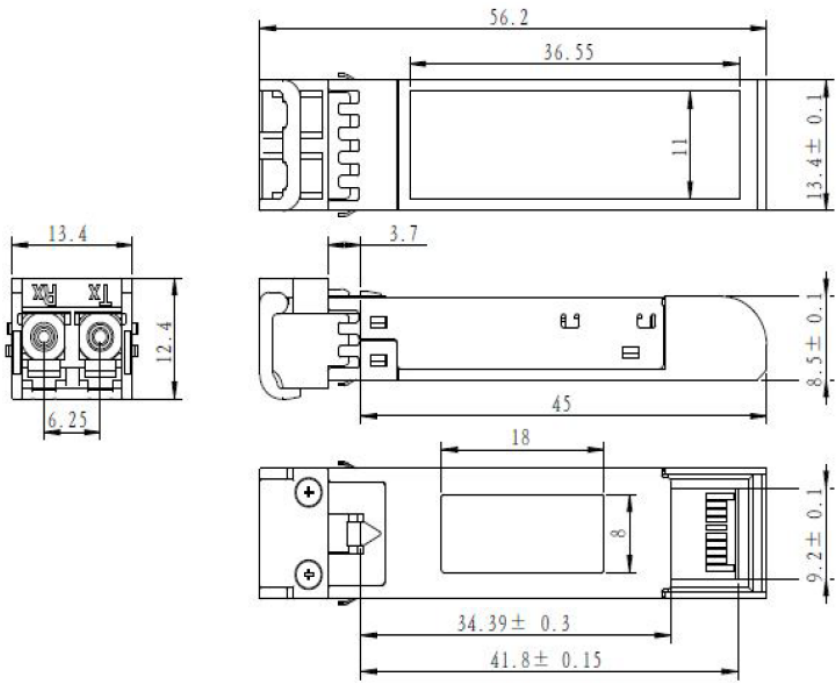
Electrical Pin-Out Details



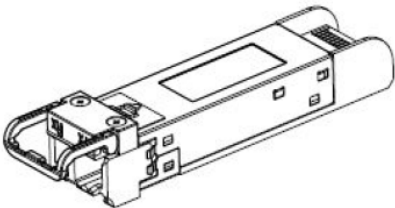
Block Diagram



Mechanical Specifications



LATCHED



UNLATCHED

About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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